

Appln. No. 10/074,514  
Amdt. dated: August 1, 2005  
Reply to Office Action dated May 6, 2005

### **Remarks/Arguments**

These remarks are in response to the Office Action dated May 6, 2005. This reply is timely filed.

At the time of the Office Action, claims 1-14 were pending in the application. Claims 1-14 were rejected under 35 U.S.C. §103(a). The rejections are set out in more detail below.

#### **I. Brief Review of Applicants' Invention**

Prior to addressing the Examiner's rejections, a brief review of Applicants' invention is appropriate. The invention is directed to a specific problem associated with the situation where a wireless base station communicates with a plurality of spatially separated repeaters. In conventional systems, different repeaters typically have been assigned different RF frequencies for backhaul communications with the same base station. The use of different frequencies tended to prevent communications on one repeater's backhaul link from interfering with communications on another repeater's backhaul link.

However, when an RF frequency is dedicated to a particular repeater for backhaul communications, it is then no longer available for other uses. Notably, the RF frequency typically remains unavailable even if the repeater to which it is assigned is inactive. This represents an inefficient use of RF spectrum. The invention solves the foregoing problem by allowing use of the same RF frequency for backhaul communications between a base station and multiple repeaters. This advancement is made possible by the use of an adaptive or "smart" antenna system at the base station. The adaptive antenna technology allows the base station to spatially isolate communications on a first RF backhaul of a first repeater from communications on a second RF backhaul of a second repeater. This feature also permits the same RF carrier frequency to be reused more frequently within a group of cells. Implementing multiple repeater backhaul links on the same RF frequencies, either within a cell or

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among a group of cells, can be highly advantageous as it increases the available bandwidth for ground link communications with mobile communication devices.

II. Rejections of Claims 1-4 and 8-11 Based on Bongfeldt in View of Ma

In the Office Action, claims 1-4, 8-11 were rejected under 35 U.S.C. §103(a) as being unpatentable over Published U.S. Patent Appln. No. 2002/0045431 to Bongfeldt ("Bongfeldt") in view of U.S. Patent No. 6,801,514 to Ma ("Ma"). Bongfeldt does disclose a wireless repeater communicating with a wireless base station. However, Bongfeldt provides no suggestion of any method for reducing the number of carrier frequencies required for backhaul communications between a single base station and multiple repeater stations. In fact, Bongfeldt is not directed to this problem at all. Instead, Bongfeldt merely discloses a system for an intelligent gain controller used on the repeater. Bongfeldt does note that smart antenna technology can be used at a base station. However, Bongfeldt discloses the use of such technology for communications between a base station and a wireless communication device (WCD), such as a cell phone. Bongfeldt does not disclose or suggest the use of smart antenna technology for the backhaul link between the repeater and the base station.

Ma also discloses the use of smart antenna technology at a base station. However, like Bongfeldt, Ma also proposes the use of such technology for communications between a base station and the mobile phones. Ma does not disclose or suggest any method for reducing the number of carrier frequencies required for backhaul communications between a single base station and multiple repeater stations. In fact, Ma is not directed to the problem of repeater backhaul communications at all. Instead, Ma discloses a system for providing SDMA (spatial division multiple access) communication channels, between a base station and a mobile phone, in a non-SDMA system.

According to the Examiner, claims 1-4 and 8-11 would have been obvious based on the combination of Bongfeldt and Ma. The Examiner contends that it would be obvious to modify the base station of Bongfeldt such that it accommodates an adaptive

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array antenna. However, neither of the cited references teaches the use of adaptive antenna processing to spatially isolate repeater backhauls, as recited in claims 1 and 8. Accordingly, the proposed combination would not teach the claimed invention.

In order to render a claim unpatentable as being obvious over a combination of prior art references, there must be some suggestion or motivation to combine the references. The cited references do not teach or suggest the claimed invention. Moreover, none of the cited references even recognize the problem to be solved, i.e. improving spectrum and reuse efficiency with regard to repeater backhaul channels. Given the foregoing, there is nothing to suggest that the claimed invention would have been within the knowledge of persons of ordinary skill in the art. Accordingly, Applicants believe that the Examiner's rejection of claims 1-4 and 8-11 based on Bongfeldt in view of Ma, should be withdrawn.

III. Rejections of Claims 5-7 and 12-14 Based on Bongfeldt  
in view of Ma, and Further in View of Dean

Claims 5-7, and 12-14 were ejected under 35 U.S.C. §103(a) as being unpatentable over Bongfeldt in view of Ma as applied to claim 1, and further in view of U.S. Patent No. 5,771,017 to Dean ("Dean"). However, Dean fails to make up for the deficiencies of Bonfeldt and Ma. Dean does not disclose or suggest any method for reducing the number of carrier frequencies required for backhaul communications between a single base station and multiple repeater stations. In fact, Dean is not directed to the problem of repeater backhaul communications at all. Instead, Dean relates to specific implementations of a smart antenna for communications between a base station and mobile station. Consequently, claims 5-7 and 12-14 are believed to be patentable at least by virtue of their dependence upon an allowable base claim.

IV. Conclusion

For the foregoing reasons, this entire application is believed to be in condition for allowance. Consequently, such action is respectfully requested. The Applicant

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requests that the Examiner call the undersigned if clarification is needed on any matter within this Amendment, or if the Examiner believes a telephone interview would expedite the prosecution of the subject application to completion.

Respectfully submitted,

8-1-05  
Date



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